Claims

1. A method of producing and treating a sheet suited to be used as a component or as a part of a component (2, 12, 14, 16) in a fuel assembly for a nuclear light water reactor, which method comprises the following steps:

a) producing a sheet of a Zr-based alloy by forging, hot rolling and cold rolling in a suitable number of steps, wherein said alloy contains at least 96 weight percent Zr and is of such a kind that the sheet is suitable to be used for said component (2, 12, 14, 16),

d) carrying out an $\alpha+\beta$ quenching or a β quenching of the sheet when the sheet has been produced to a thickness which is equal to the final thickness, or at least almost equal to the final thickness, of the finished sheet,

e) heat treatment of the sheet in the α-phase temperature range of said alloy,

wherein step c) is carried out after that steps a) and b) have been carried out, characterised in that a stretching of the sheet is carried out during the heat treatment according to step c).

2. A method according to claim 1, wherein step b) is a β quenching.

3. A method according to claim 1 or 2, wherein said stretching is carried out at a temperature of at most the temperature which constitutes the highest temperature in the α-phase temperature range of the alloy and at least at the temperature which is 70% of said highest temperature with regard to °K.

4. A method according to claim 3, wherein said stretching is carried out at a temperature which is between 80% and 98% of said highest temperature with regard to °K.

5. A method according to any of the preceding claims, wherein said stretching is carried out such that the sheet directly after hav-

ing gone through the stretching has a remaining elongation compared to the state of the sheet immediately before the stretching.

6. A method according to claim 5, wherein said stretching is carried out such that said elongation is longer than the critical degree of deformation of the alloy.

7. A method according to claim 5 or 6, wherein said remaining elongation is between 0.1% and 7%.

8. A method according to claim 7, wherein said remaining elongation is between 0.2% and 4%.

9. A method according to any of the preceding claims, wherein said component (2, 12, 14, 16) defines a longitudinal direction which, when the component is used as intended in said fuel assembly, is at least substantially parallel to the longitudinal direction (10) of the fuel assembly and wherein said stretching of the sheet is carried out in a direction which corresponds to the longitudinal direction of said component (2, 12, 14, 16) for which the sheet is intended.

10. Use of a sheet produced and treated according to the method according to any of the preceding claims as said component or as a part of said component (2, 12, 14, 16) in a fuel assembly for a nuclear light water reactor.

11. Use according to claim 10, wherein said component is a channel box (2) which defines an inner space, inside the channel box (2), in the fuel assembly, wherein a plurality of fuel rods (3) are arranged in said inner space and wherein said sheet is used for at least one of the walls of the channel box (2).

12. Use according to claim 10 or 11, wherein the fuel assembly is a fuel assembly for a nuclear boiling water reactor.

13. Use according to claim 12, wherein said component is a water channel (12, 14, 16) arranged in the fuel assembly in order to enable a flow through the fuel assembly of non-boiling water and wherein said sheet is used as at least one wall of said water channel (12, 14, 16).

14. A method of producing a channel box (2) for a fuel assembly for a nuclear boiling water reactor, which method comprises:

producing and treating a plurality of sheets with the method according to any of the claims 1-9,

accomplishing a suitable shape of these sheets and joining the sheets such that said channel box (2) is formed.

15. A method of producing a water channel (12, 14, 16) for a fuel assembly for a nuclear boiling water reactor, which water channel (12, 14, 16) is intended to form part of said fuel assembly for enabling a flow through the fuel assembly of non-boiling water, which method comprises

producing and treating a plurality of sheets with the method according to any of the claims 1-9,

accomplishing a suitable shape of these sheets and joining the sheets such that said water channel (12, 14, 16) is formed.

16. A fuel assembly for a nuclear boiling water reactor comprising:

a channel box (2) with a material structure obtained by the fact that the sheet which forms at least the main part of the walls of the channel box (2) is produced and treated according to the method according to any of the claims 1-9,

a plurality of fuel rods (3) comprising nuclear fuel material arranged within said channel box (2).

17. A fuel assembly for a nuclear boiling water reactor comprising:

at least one water channel (12, 14, 16) with a material structure obtained by the fact that the sheet which forms at least the main part of the walls of the water channel (12, 14, 16) is produced and treated according to the method according to any of the claims 1-9.